

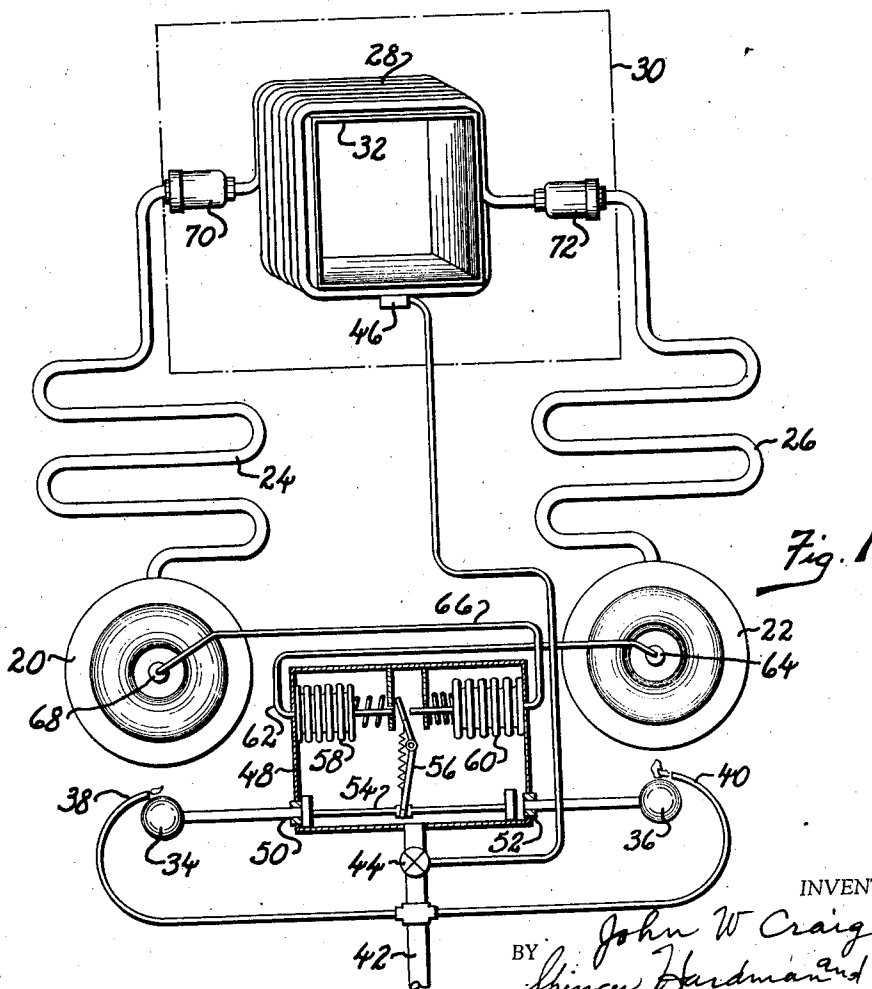
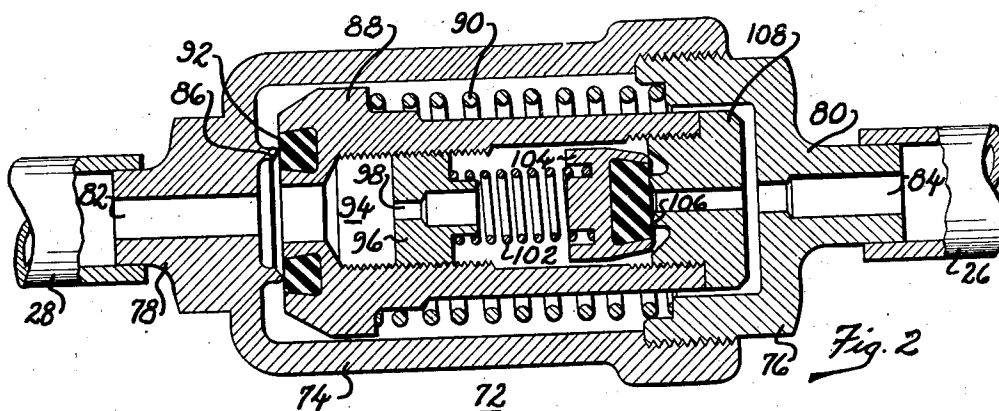
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REFRIGERATING APPARATUS

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REFRIGERATING APPARATUS

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1 Claim. (Cl. 62—5)

This invention relates to refrigerating apparatus and more particularly to twin generator-absorber refrigerating systems.

One of the simplest intermittent absorption refrigerating systems is one in which twin absorbers are connected by a single refrigerant conduit which includes condensing means connected to each of the generator-absorbers and an evaporating means between the two condensers. In such a system, during one period of operation one of the generator-absorbers is heated while the other is cooled. When all the refrigerant has been driven out of the generator being heated, the operation is reversed by the cessation of the heating of the one generator-absorber and the supplying of heat to the other generator-absorber. Under such conditions it is evident that some form of restriction must be provided between the condenser connected to the generator-absorber being heated and the evaporator during each of the above described conditions.

It is an object of my invention to provide a twin generator-absorber dual condenser system having a single evaporating means with an improved valve and restrictor means for controlling the flow of refrigerant into and out of the evaporating means.

It is a further object of my invention to provide an improved valve means providing a restriction to the flow of fluid in one direction and substantially no restriction to the flow of fluid in the opposite direction.

It is still another object of my invention to provide an improved valve means capable of controlling the flow in both directions, which is extremely simple, easy to manufacture and relatively foolproof.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is a diagrammatic illustration of a twin generator-absorber refrigeration system embodying my invention; and

Fig. 2 is an enlarged sectional view of one of the identical valves found on each side of the evaporator.

Briefly, I have shown a twin generator-absorber refrigerating system in which a single refrigerant conduit connects the two generator-absorbers. The portion of the conduit nearest each of the generator-absorbers serves as a condenser for that generator-absorber while the portion of the

conduit between the two condensers serves as the evaporator. Located between the evaporator and each of the generator-absorbers is a pair of valves made identical but located oppositely with respect to the flow of fluid through the conduit. Each of these valves contain a spring-loaded check type valve, one of which has a restrictor connected in series with it in order to provide a pressure differential between the operative condenser and the evaporator.

Referring now more particularly to the drawing, there are shown twin generator-absorbers designated by the reference characters 20 and 22. A single refrigerant conduit connects the two generator-absorbers and includes condenser portions 24 and 26 which are connected to their respective generator-absorbers 20 and 22. Connected between the two condensers 24 and 26 is a conduit portion 28 which is located within the compartment 30 to be cooled. This portion 28 of the conduit is wrapped around a rectangular sleeve 32 in order to form a suitable cooling unit.

Gas burners 34 and 36 are provided for alternately heating the twin generator-absorbers 20 and 22. These burners are lighted by pilot lights 38 and 40 which are supplied with gas directly from a supply conduit 42. The supply conduit 42 also leads to a throttling valve 44 which is controlled by a thermostat fluid system including a bulb 46 fastened in heat exchange relation with the cooling unit located in the compartment 30. The valve 44 is connected to a second valve means which includes a box-shaped casing 48 into which the gas discharges. This box-shaped casing 48 is provided with outlets 50 and 52 which connect to the gas burners 34 and 36. The flow of gas through these outlets is controlled by a double ended valve 54 which is thrown either to the left or to the right to close the outlets 50 or 52 as desired.

Connected to this double-ended valve is a simple toggle snap acting mechanism 56 which is operated by pins which extend from the bellows 58 and 60 mounted upon opposite sides of the casing. The bellows 58 is connected by a fluid conduit 62 with a thermostat bulb 64 mounted in intimate heat exchange relation with the generator-absorber 22 while the bellows 60 is connected by a fluid conduit 66 with the thermostat bulb 68 located in intimate relationship with the generator-absorber 20. The valve 54 insures that gas is supplied to the burner of only one of the generator-absorbers at a time thus one of the generator-absorbers is heated to drive off refrigerant while the other is cooled in order to absorb

refrigerant. Preferably manganese chloride is used as an absorbent and ammonia as the refrigerant so that air cooling may be readily used for condensing refrigerant in the condensers and for cooling the absorbent in one of the absorbers.

When one of the absorbers is being heated and the other cooled it is necessary to provide a means for maintaining a sufficiently high refrigerant condensing pressure within the condenser connected to the operative generator to provide condensation by air cooling. This is done by means of the identical valves 70 and 72 which are placed in the refrigerant conduit between the evaporator and each of the condensers. It is necessary that one of these valves impose sufficient restriction between the operative condenser and the evaporator while the other valve permits a free flow of refrigerant from the evaporator to the operative absorber. However, when the cycle is completed the flow of fluid is reversed and it is then necessary for the function of the two valves to be reversed and to provide a restriction between the newly operative condenser and the evaporator sufficient to bring about condensation in the newly operative condenser.

In order to do this I have provided a casing including a large cup member 74 and a closure member 76 which is threaded into the cup member in order to complete the wall of the casing. The cup member 74 is provided with a nipple 78 which connects to the conduit portion 28 while the closure member 76 is provided with a nipple 80 which connects to the condenser conduit portion 26. The nipples each contain passages connecting with the conduits. Nipple 78 is provided with a passage 82 while the nipple 80 is provided with a passage 84. The mouth of the passage 82 within the casing is provided with a valve seat 86 against which rests a valve member 88 provided with a shoulder receiving a compression type coil spring 90 extending from this shoulder to a shoulder upon the rim of the closure member 76 for holding the valve member 88 against the valve seat 86. The valve member 88 is provided with an annular recess containing a ring 92 of a suitable rubber-like material such as one having as its principle ingredient polymerized chloro-2-butadien-1,3 sometimes called chloroprene. This valve 88 permits free flow of evaporated refrigerant from the evaporating conduit portion to the condenser portion 26.

Within this valve is a passage 94 containing a threaded insert 96 provided with a restricted passage 98. This threaded insert 96 has a boss

which holds one end of a compression type coil spring 102. The other end of this compression type coil spring 102 bears against a second valve member 104 provided with a face of a material similar to that of ring 92. This valve member 104 is held in seating engagement with a valve seat 106 formed upon a plug 108 threaded into the large end of the passage 94 which extends from one end of the valve member 88 to the other and opens directly into the passage 82. The plug 108 also contains a restricted passage which opens directly into the passage 84.

When pressure is created upon the side of the valve which is connected to the condenser 26 this pressure will hold the valve 88 in tightly closed position. This pressure, however, does have access to the valve 104 which opens in the opposite direction and when sufficient pressure is attained the valve 104 will be forced open to allow refrigerant to flow through the restricted passage 98 and the passage 82 into the evaporating portion 28. The seat 106 is made of sufficiently small area to make it necessary for the pressure to rise sufficiently to allow condensation by the cooling action of the air. The valve 70 is identical to the valve 72 and is similarly connected to its end of the evaporating portion 28 and to its condensing portion 24.

I find that these valves are simple, easy to manufacture and very reliable. They aid in making a very simple refrigerating system of the twin generator-absorber type.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claim which follows.

What is claimed is as follows:

Refrigerating apparatus including a plurality of generator-absorbers, a condenser connected to each of the generator-absorbers, an evaporator connected to two of said condensers, and a flow control device located in each of the connections between said evaporator and said two condensers, each of said flow control devices including two passages for conducting refrigerant to and from the evaporator respectively, one of said passages including a constantly open restricted portion and a second portion in series therewith, a valve for controlling the flow through said second portion and a valve for controlling the flow through the other of said passages.

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